

THE OUTLOOK FOR GLOBAL TRADE IN LIQUEFIED NATURAL GAS - PROJECTIONS TO THE YEAR 2020

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JAMES T. JENSEN
Jensen Associates
49 Crescent Street; Weston, MA 02493 U.S.A.
JAI-Energy@Worldnet.ATT.Net
Website JAI-Energy.com

Phone (781) 894 2362
Fax (781) 894 9130
E Mail

UNTIL THE MID 1990S, WORLD LNG TRADE WAS DEFINED BY TWO CHARACTERISTICS

- It Was Largely a Pacific Basin Trade
- And It Was Based on "Destination Inflexible" Long Term Contracts Between Specific Sellers and Specific Buyers
- But Now Demand is Surging Both from Previously "Gas Poor" Countries and from Europe and North America
- And the Traditional, Rigid Long Term Contract Fell Victim to the World-Wide Restructuring of the Gas Industry
- The Result is a Global Gas Market in Which Pipelines and LNG Compete for Markets and LNG is the Mechanism for Transmitting Pricing Signals Around the World

THE CURRENT OUTLOOK FOR LNG HAS BECOME HIGHLY UNCERTAIN BECAUSE OF

- Unexpected Sharp Increases in Demand, Particularly in North America, Spain and the U.K.
- The Normal Lag in Plant Construction, Which Makes it Difficult for a Timely Supply Response to the Increased Demand
- The Surge in Demand for Plant Construction Which has Overwhelmed the Capabilities of Construction Firms and Equipment Suppliers, Leading to Higher Costs and Project Delays

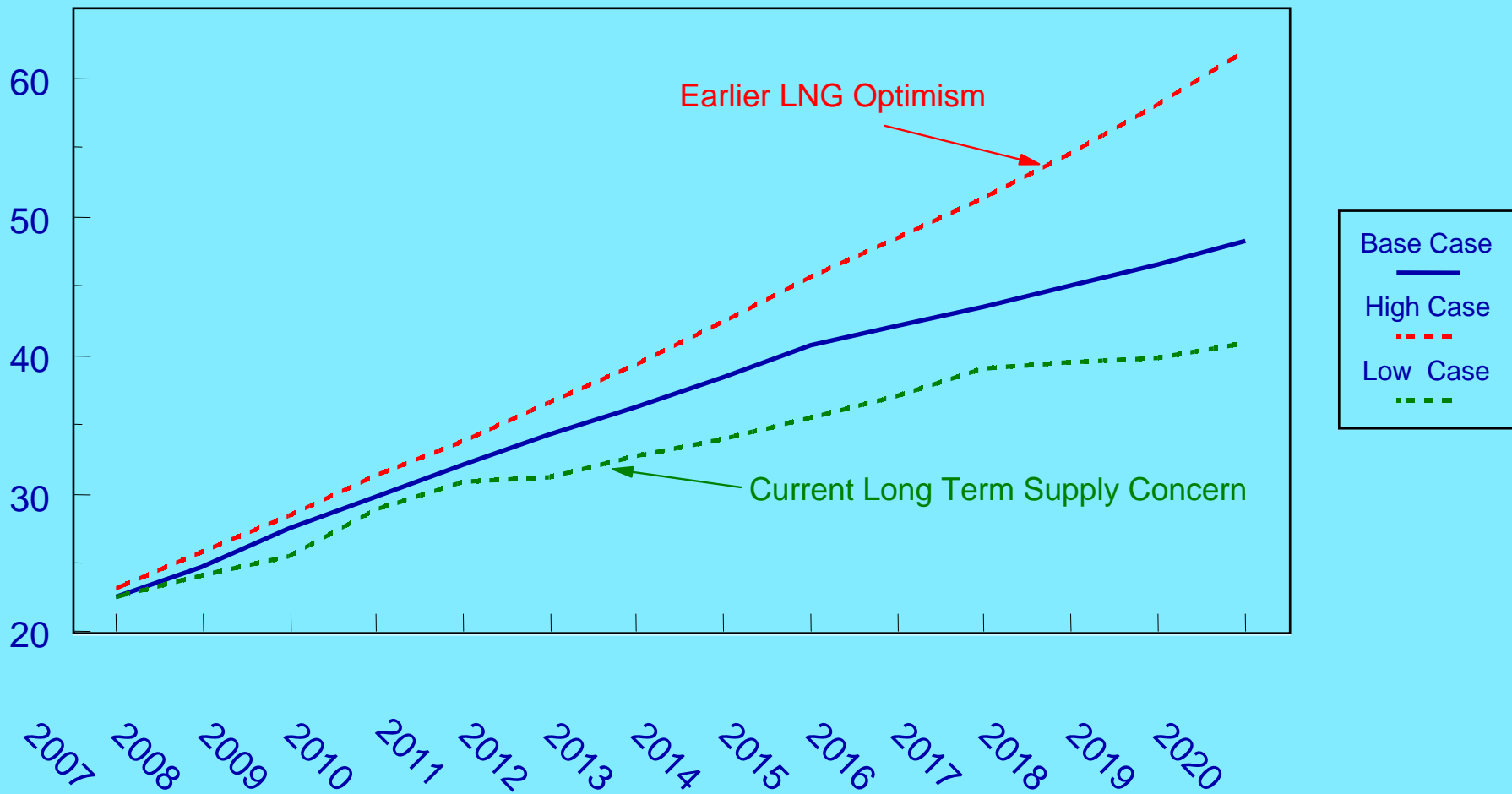
- The Sharp Increase in Oil and Other Energy Prices Raising Questions About Demand Response and Interfuel Competition
- The Political Reaction to Global Warming and How It Will Affect Competition Between Coal and Gas for Power Generation
- Geopolitical Issues that Will Determine When and How LNG Projects Will Go Forward in Supplying Countries
- And LNG's Sensitivity to Small Changes in the World's Gas Supply/Demand Balance

THIS STUDY ADDRESSES THESE UNCERTAINTIES BY UTILIZING THREE ILLUSTRATIVE SCENARIOS

- They Are:
 - A Base or Reference Case
 - A High Case Reflecting Earlier Market Optimism
 - A Low Case Reflecting Concerns About Supply
- Forecasts in the Early 2000s Tended to be Very Optimistic About the Demand for Gas and Particularly About LNG
- High World Energy Prices and Concerns for LNG Supply Have Tended to Reduce the Estimates and There is Now Some Concern About How Rapidly LNG Demand Will Grow After 2011 When Current Projects are Completed

Figure 4
THREE WORLD LNG GROWTH SCENARIOS
BCFD

LNG SUPPLY - BCFD



FOR A TIME, LNG COSTS WERE DECLINING AND IT WAS ASSUMED THAT THE TREND WOULD FURTHER STIMULATE WORLD TRADE

- But the Trend Towards Declining Plant Costs Has Been Dashed by Cost Increases from an Overloaded Project Construction Industry
- Some Bids are Dramatically Higher than Historic Experience, But Even Discounting the Special Cases, Long Run Costs Have Clearly Risen Substantially
- The Recent History of the "Order Book" - Projects Scheduled for Completion over the Next Four Years - Illustrates the Problem
- And an Estimate of Changing Costs Over Time Shows the Effect

Figure 5

THE CAPACITY THAT IS SCHEDULED TO COME ON LINE OVER THE FOLLOWING FOUR YEARS - THE "ORDER BOOK" - HAS BEEN STEADILY RISING PUTTING PRESSURE ON THE CONTRACTORS TO DELIVER MILLION TONS OF CAPACITY

CAPACITY SCHEDULED FOR DELIVERY

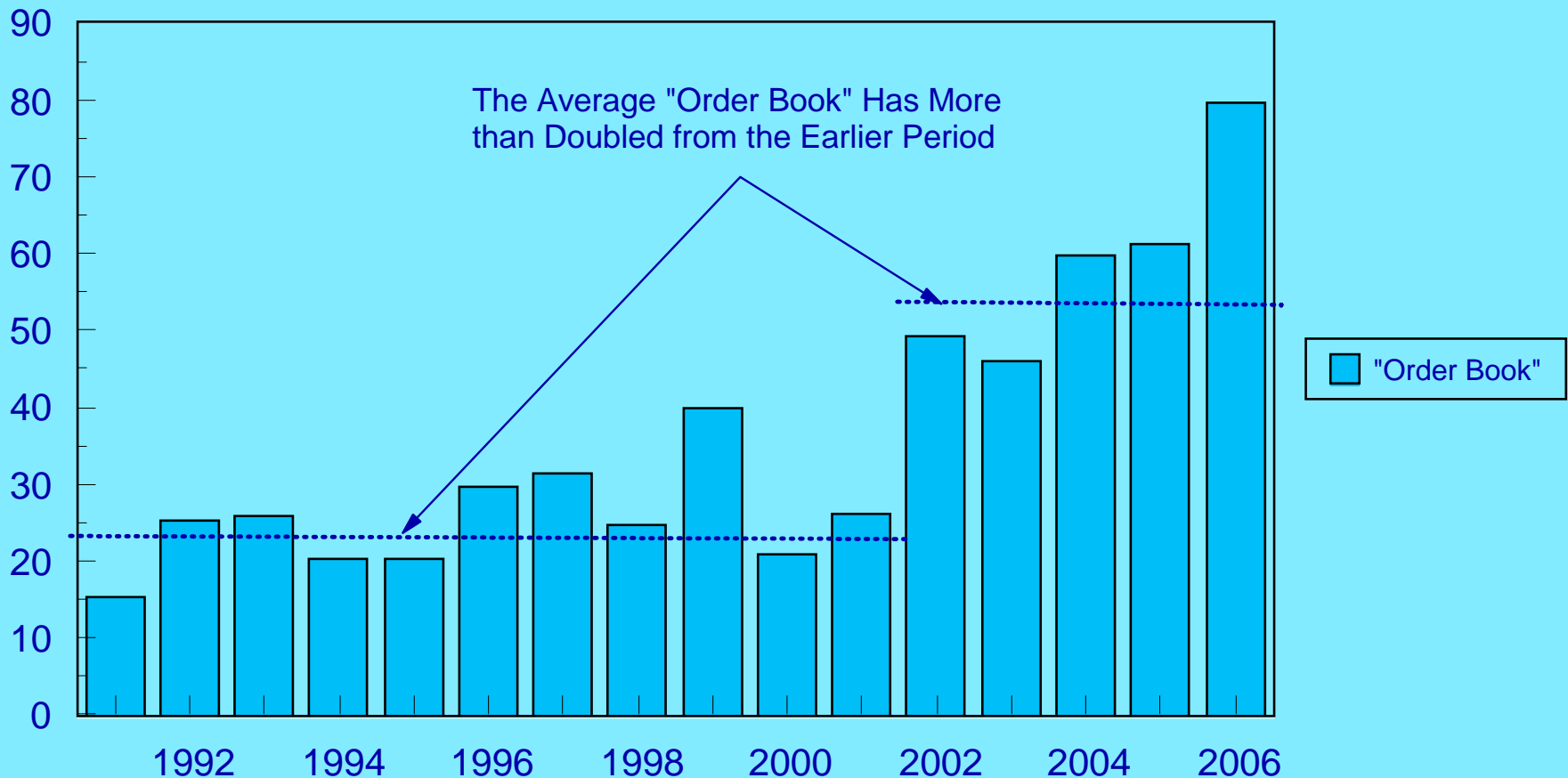
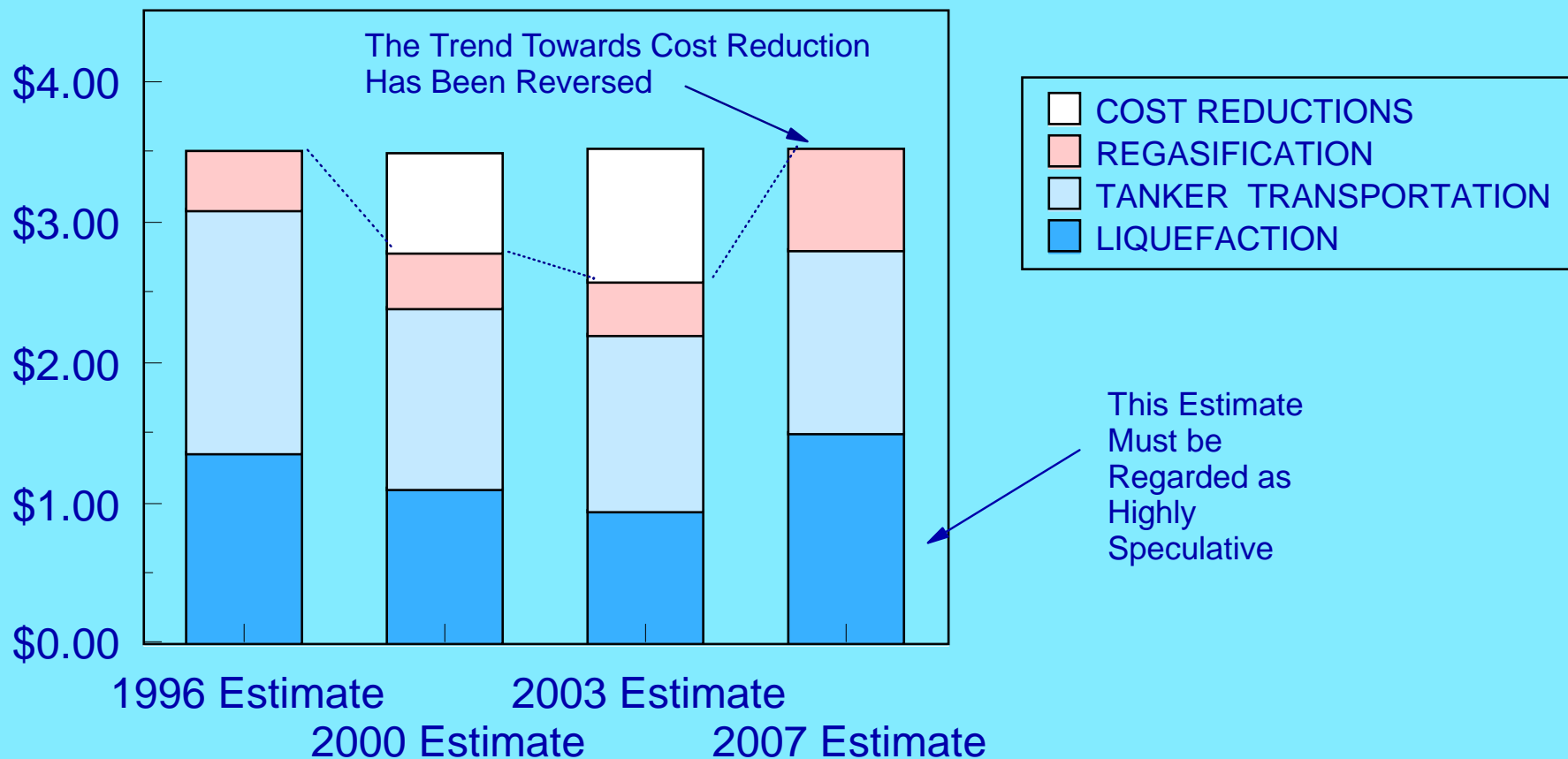


Figure 6

**AN ILLUSTRATION OF LNG TRANSPORTATION
COSTS OVER TIME FOR A HYPOTHETICAL LNG TRADE
FROM AUSTRALIA TO SOUTHERN CALIFORNIA
FOUR RECENT COST ESTIMATES**

\$ PER MMBTU



Cost Estimates That Might Have Been Made in the Stated Years

Jensen

WHERE WILL THE LNG COME FROM?

RESOURCES, TECHNOLOGY AND GEOPOLITICS

- The World's Reserves of Natural Gas Are Very Large and Appear More Than Adequate to Support Gas Trade Far Into the Future
- But Many of Those Reserves are Either Already Committed or Located in Places Where Economics, Technology or Geopolitics Raise Questions About How Soon They Will be Commercially Available
- 84% of the Reserves that are Uncommitted are Located in the Middle East or the Former Soviet Union
- And There are Geopolitical and/or Technical Issues for Both Regions

PACIFIC BASIN MARKETS HAVE BEEN VERY TIGHT, LARGELY BECAUSE OF PROBLEMS IN INDONESIA

- Severe Supply Problems in That Country Have Raised Questions About its Future Supply Contributions
- A Large Portion of the Pacific Basin's Future Supply Increases Will Come From Australia, Both from Offshore Western Australia, and the Timor Sea
- But if Future Contributions from Indonesia are Limited, Much of the Future Supply for Pacific Basin Markets Will Have to Come from the FSU or the Middle East

- Russia's Sakhalin Island Has Great Resource Potential, But Geopolitical Issues Have Raised Questions About How Much Will be Made Available Beyond the Sakhalin II Project, Now Under Construction
- Russia Has Major Policy Issues to be Resolved in Western Siberia and the Offshore Barents Sea, Whose Outcome Will Influence How Russia Approaches Longer Term Expansion into the Pacific
- Russia is Traditionally a Pipeline Exporter and the Question of How Much to Diversify into LNG Will Have a Powerful Influence on LNG Trade, Both in the Atlantic and Pacific Basins

Figure 13
MAJOR GAS EXPORT BASINS FOR
THE FORMER SOVIET UNION



THE MIDDLE EAST WILL BE THE DOMINANT INCREMENTAL SUPPLIER TO THE PACIFIC BASIN BETWEEN NOW AND 2020

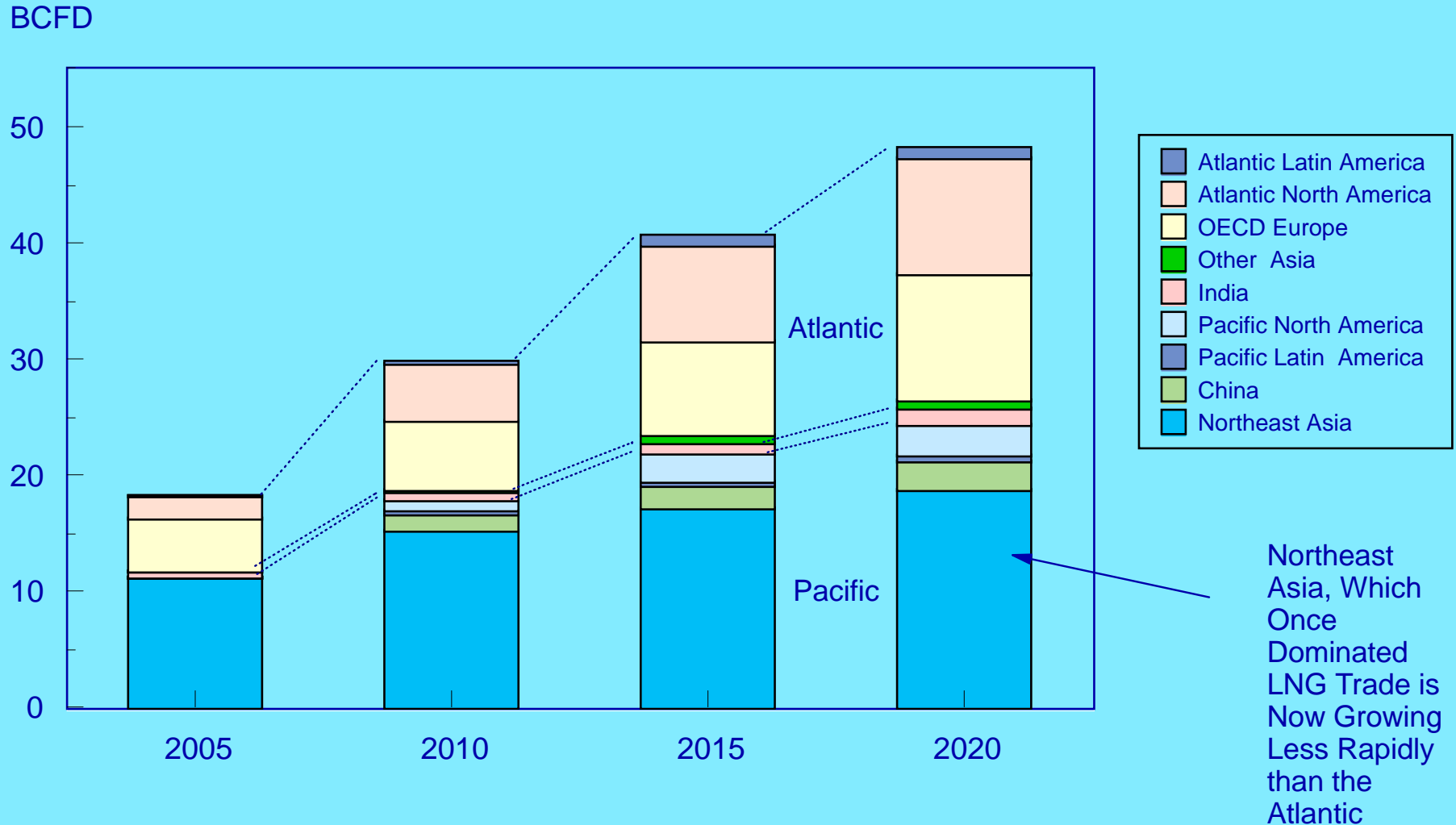
- But 61% of the Middle East's Uncommitted Gas is in a Single Gas Field Shared by Qatar and Iran
- And If One Includes the Additional Uncommitted Gas in Iran, Those Two Countries Account for Nearly 90% of the Uncommitted Gas in the Entire Middle East
- Qatar has Declared a Moratorium on Further LNG Expansion Beyond 2012 and Iran is Under International Sanctions
- Qatar's Caution Plus Iran's Geopolitical Constraints Thus Make It Difficult to Project the Quantities and Timing of Additional Middle East LNG Supplies Beyond 2012

THE DEMAND PROJECTIONS

- While Northeast Asia Once Dominated LNG Trade, It is Being Surpassed by the Atlantic Basin
- Construction Already Under Way Will Provide a "Bulge" in Supply - and Demand - Between 2005 and 2010; For the Base Case, Demand Slows Somewhat in Later Years
- By 2020, OECD Europe in the Atlantic Basin Will Provide the Largest Regional Market, Although if Atlantic and Pacific North America Are Combined, They Will be Somewhat Larger
- Europe Provides a Very Strong Market in the High Case, But its Reliance on Pipelines in the Low Case Blunts its Contribution to Demand

Figure 17

BASE CASE PROJECTIONS OF WORLD LNG DEMAND BY REGION BCFD



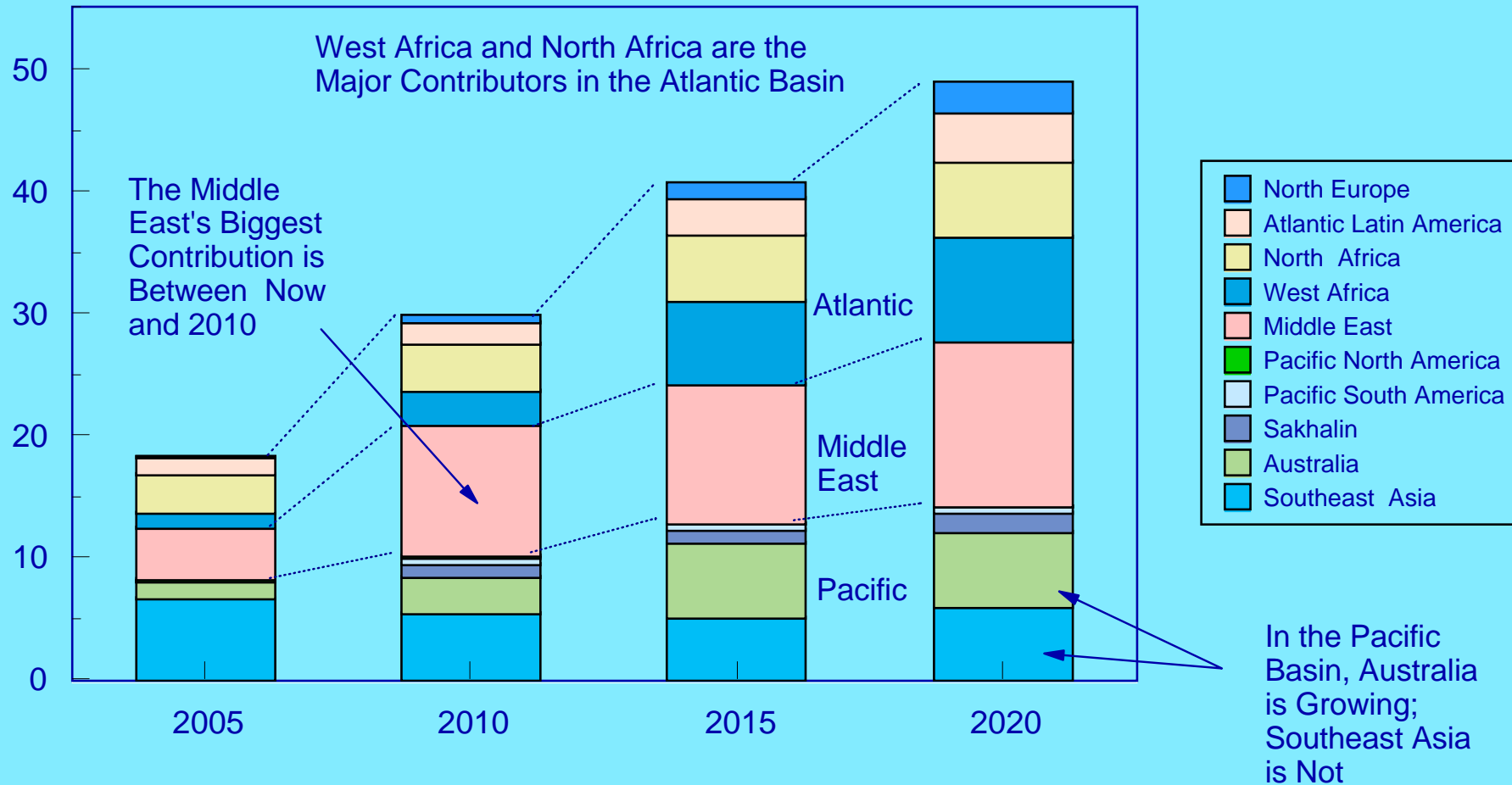
THE SUPPLY PROJECTIONS

- With Qatar Leading the Way, Middle East Supply Will Grow Rapidly Between Now and 2010; Thereafter Growth Will be More Modest
- Australia Is Growing Rapidly in the Pacific Basin: Southeast Asia is Not
- Atlantic Basin Supply Will Benefit From Major Additions in North and West Africa
- We Assume That Iran in the Middle East and Russia in the Atlantic Basin Will Become Important Exporters During the Latter Part of the Forecast

Figure 21

BASE CASE PROJECTIONS OF WORLD LNG SUPPLY BY REGION BCFD

BCFD



IN CONCLUSION

- Under All Three Scenarios of This Study, LNG Demand Will Experience High Rates of Growth
- But There Are Very Substantial Uncertainties in the Way in Which That Demand Will Develop and Will be Supplied
- The Way in Which World Gas Demand Responds to a High Energy Price/High Cost Environment Will be an Important Determinant of How Much LNG Will be Needed
- And the Rate at Which Supply Will be Made Available Will Depend in Large Measure on How Suppliers Deal With the Technical, Economic and Geopolitical Uncertainties Inherent in Some of the Future Supply Options